

Practice: 521A - Pond Sealing or Lining, Flexible Membrane**Scenario: #1 - Flexible Liner with leak detection line****Scenario Description:**

A flexible, geosynthetic membrane liner is installed to prevent seepage from waste storage impoundment structures. A leak detection line, geotextile to cushion liner from subgrade damage, and a liner with vents anchored around the top of an earthen pond are installed.

Associated practices include Pond (378), Waste Storage Facility(313), Heavy Use Area Protection (561), Critical Area Planting (342), Access Road (560) Waste Transfer (634) Underground Ground Outlet (620) and Fence (382)

Before Situation:

Soils on-site exhibit seepage rates in excess of acceptable limits. If not lined, soils will allow the passage of nutrients and pathogens from the waste storage facility or pond negatively impacting water quality.

After Situation:

A 60mil, HPDE flexible liner is installed after a leak detection line is placed. The entire area is covered with geotextile. The measurement is based on the neatline of square feet of material installed to inside top slope. Environmental protection is provided by avoiding seepage losses from waste storage impoundments.

Scenario Feature Measure: Surface area of Liner Material (To Inside top of slope)

Scenario Unit: Square Foot

Scenario Typical Size: 21,700

Scenario Cost: \$34,758.84

Scenario Cost/Unit: \$1.60

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Front End Loader, 185 HP	1619	Wheeled front end loader with horsepower range of 160 to 210. Equipment and power unit costs. Labor not included.	Hour	\$108.25	4	\$433.00
Roller, vibratory, towed	1330	Towed vibratory smooth or tamping foot (sheepsfoot) roller compactor typically 25 ton. Equipment cost only. Does not include pulling equipment. Add Tractor or Dozer.	Hour	\$64.93	4	\$259.72
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$49.21	32	\$1,574.72
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.37	2420	\$5,735.40
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$63.85	8	\$510.80
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$28.85	12	\$346.20
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$98.18	64	\$6,283.52
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$32.18	8	\$257.44
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.97	40	\$918.80
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.91	16	\$670.56
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$5.90	2420	\$14,278.00

Materials

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$31.40	45	\$1,413.00
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$4.01	300	\$1,203.00

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$291.56	3	\$874.68
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Practice: 521A - Pond Sealing or Lining, Flexible Membrane**Scenario: #2 - Flexible liner used for Agrichemical Mixing Facility****Scenario Description:**

A flexible, geosynthetic membrane liner is installed to prevent seepage from an agricultural chemical handling facility. Geotextile is installed on entire area to cushion liner from subgrade damage. The liner is anchored with vents.

Associated practices include Pond (378), Heavy Use Area Protection (561), Critical Area Planting (342), Access Road (560), Underground Ground Outlet (620), and Fence (382)

Before Situation:

Soils on-site exhibit seepage rates in excess of acceptable limits. If not lined, soils will allow the passage of nutrients and pathogens from the waste storage facility or pond negatively impacting water quality.

After Situation:

A flexible liner suitable for chemicals or pesticides is installed over geotextile. The measurement is based on the neatline of square foot of material installed to inside top of slope. Environmental protection is provided by avoiding seepage losses from spillage within facility designed to contain spillage.

Scenario Feature Measure: SF of liner to inside top

Scenario Unit: Square Foot

Scenario Typical Size: 2,500

Scenario Cost: \$5,499.10

Scenario Cost/Unit: \$2.20

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Roller, static, smooth, self propelled	1392	Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor.	Hour	\$22.83	2	\$45.66
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$49.21	16	\$787.36
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.37	102	\$241.74
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$63.85	4	\$255.40
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$98.18	16	\$1,570.88
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$32.18	8	\$257.44
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.97	18	\$413.46
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.91	8	\$335.28
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$28.85	4	\$115.40
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$5.90	102	\$601.80

Mobilization

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$291.56	3	\$874.68
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